

## Teaching Operations with Polynomials using Algebra Tiles (real and virtual)

1. With your partner decide on a scaffolded sequence of “challenges” that help students SEE the following:
  - a. How do you represent a polynomial expression using algebra tiles?
  - b. How do you add two polynomials with positive coefficients only using algebra tiles?
  - c. How do you add two polynomials with positive and negative coefficients using algebra tiles?
  - d. How do you subtract two polynomials with positive and negative coefficients?
    - i. How is subtraction related to addition and how is that used in subtracting polynomials.
- 1.1 Record the challenges in sequence and be prepared to demonstrate the work with the tiles.
- 1.2 Be prepared to share your thinking on the following question: How is the work of adding polynomials related to the work with adding and subtracting Integers?

2. With your partner decide on a scaffolded sequence of “challenges” that help students SEE the following:
- a. How do you represent the product of a multiplication of a given
    - i. two monomials and
    - ii. monomial and a binomial using algebra tiles?
  - b. How do you represent the product of a multiplication two given binomials with positive coefficients using algebra tiles?
  - c. How do you represent the product of two given binomials with positive and negative coefficients using algebra tiles?
    - i. What is the role of the distributive property in this process of these multiplications in a. b. and c.?
  - d. How do you find the two polynomial factors with positive and negative coefficients for a given product using algebra tiles? (working backwards, factoring, division)
    - i. How is factoring related to multiplication

2.1 Record the challenges in sequence and be prepared to demonstrate the work with the tiles.

2.2 Be prepared to share your thinking on the following question: How is the work of multiplying and factoring with polynomials related to the work with multiplying and factoring Integers?

2.3 How can you use Algebra Tiles to help students SEE the special products  $(a+b)^2$ ,  $(a-b)^2$ , and  $(a+b)(a-b)$ ?

2.4 How can you use Algebra tiles to help students SEE how we *complete the square*?

### HOMEWORK:

3. Investigate the following apps and determine how useful these may be in a classroom (assuming adequate access to technology). Be prepared to share your findings next class.
  - a. National Library of Virtual Manipulatives (NLVM):  
<http://nlvm.usu.edu/en/nav/vlibrary.html> try the following app:  
Algebra Tiles (In Algebra, grades 9-12)
  - b. NCTM Illuminations: <http://illuminations.nctm.org/activity.aspx?id=3482>
  - c. Virtual Algebra Tiles:  
[http://media.mivu.org/mvu\\_pd/a4a/homework/applets\\_expressions.html](http://media.mivu.org/mvu_pd/a4a/homework/applets_expressions.html)
  - d. Find (free) apps for your iPad, Surface, or Chromebook and upload these and investigate their usefulness. What might be the advantage of touch capacity of iPad and Surface?